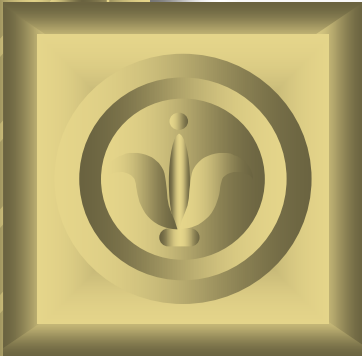


System Analysis and Design (SAD)



Required Text Book

**Modern System Analysis & Design, 5th
Edition**

**Jefferey A. Hoffer, Joey F. George and
Joseph. S. Valacich, 2005**

Chapter-1:

Outline

- **Information System: Overview & Basic Concepts**
- **Information System Analysis and design**
- **Systems: Definition**
- **SAD: Core concepts**
- **Types of information system**
- **System and system analyst**

Information System: Overview & Basic Concepts

- **Data: ???**
- **Information: ???**
- **Information System: ???**

System Analysis and Design (SAD)

- **Analysis:** defining the problem
 - From requirements to specification
- **Design:** solving the problem
 - From specification to implementation

System Analysis and Design (SAD)

- **Systems Analysis:** understanding and specifying in detail what an information system should do
- **System Design:** specifying in detail how the parts of an information system should be implemented
- **Definition of SAD:**
 - The complex organizational process whereby computer-based information systems are developed and maintained.

Why is it important?

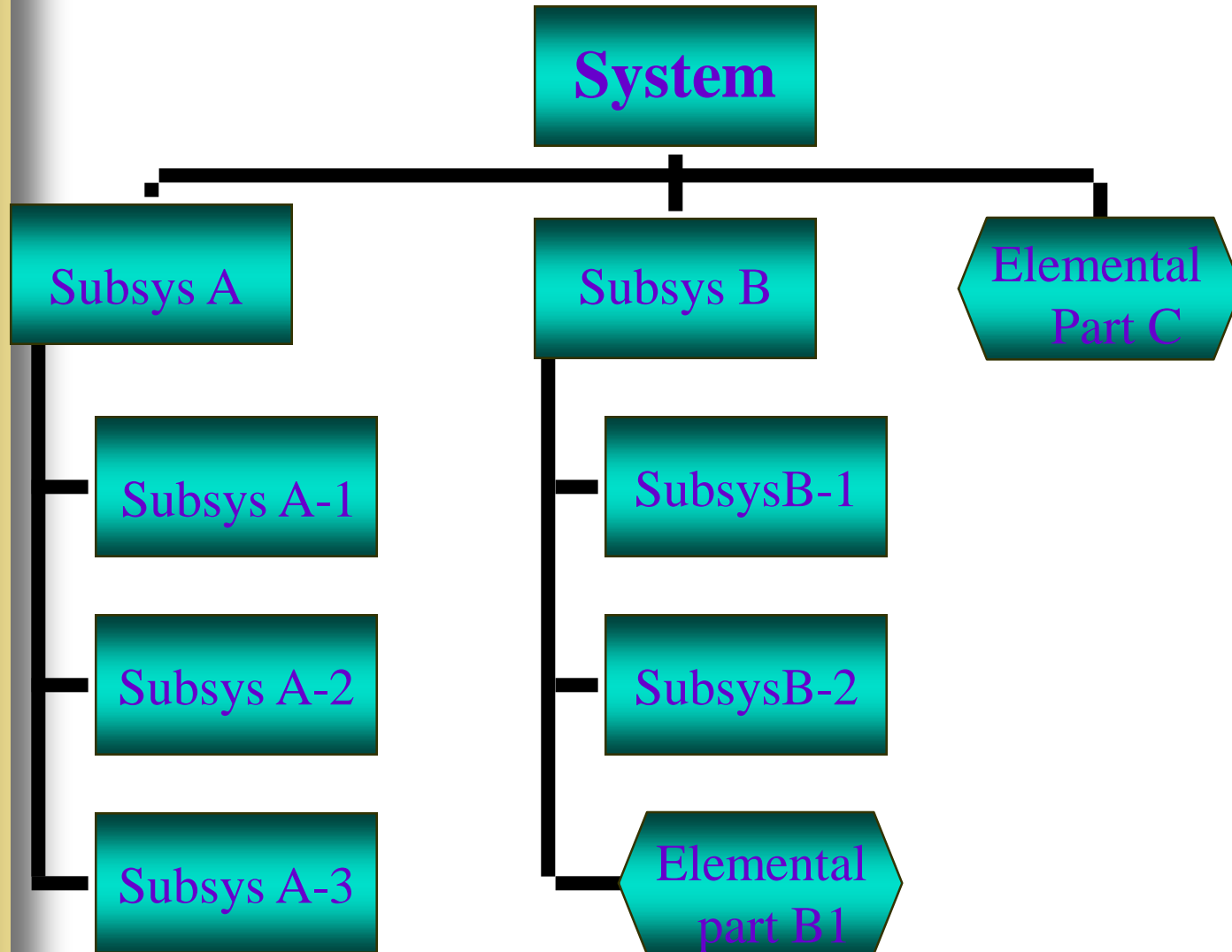
- Success of information systems depends on good SAD
- Widely used in industry - proven techniques
- Part of career growth in IT - lots of interesting and well-paying jobs!
- Increasing demand for systems analysis skills

What is a System?

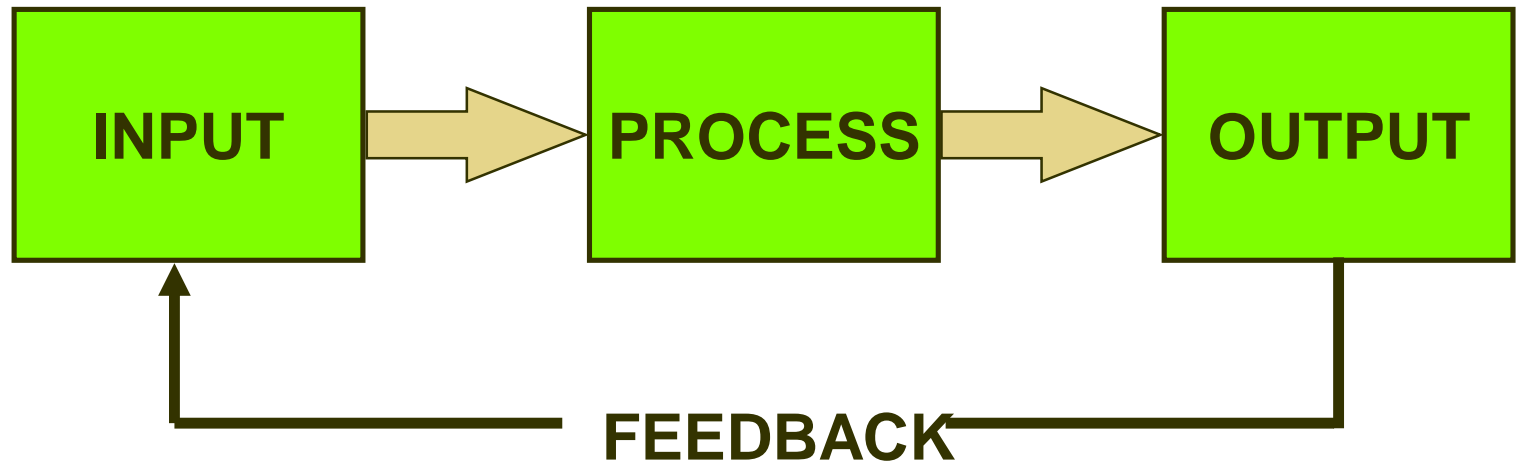
- A **collection of parts** that work together to achieve a goal/task
 - Examples
 - Solar system
 - Digestive systems
 - Public transport system
 - Central heating system
 - Computer system
 - Information system
- A system is a group of interrelated components, called subsystems, working together toward a common goal by accepting inputs and producing outputs in an organized transformation process.

Systems

Can Be Composed of Subsystems



System Elements



What is subsystem?

- **A subsystem is simply a system within a system.**
 - **Automobile is a system composed of subsystems:**
 - **Engine system**
 - **Body system**
 - **Frame system**
 - **Each of these subsystem is composed of sub-sub --systems.**
 - **Engine system: generator system, fuel system, and so on**

Computer-based Information Systems (CBIS) vs Manual Systems

- **CBIS**

- **Information system that rely on computer hardware and software for processing and disseminating information**

- **Manual systems**

- **Use paper + pencil technology**

CBIS Components

- **A Computer-based Information System
= Hardware + Software + People +
Procedures + Data +
Information/communication network**

What is an Information Systems?

- **Interrelated components working together to**

- **Collect**
- **Process**
- **Store**
- **Disseminate information**

**To support decision making,
coordination, control, analysis and
visualization in an organization**

System characteristics

- **Components:** either an irreducible part or an aggregate of parts, subsystem.
- **Interrelated Components:** the function of one is tied to the function of the other.
- **Boundary:** The limits of the system within which the system is contained, and that separates it from other systems.
- **Purpose:** the system's reason for existence
- **Environment:** Everything outside the system's boundary.
- **Interface:** a point at which a system meets its environment
- **Input/output**
- **Constraint:** limits that affect its normal operation. Some are imposed inside the system and others are imposed by the environment.

Important System Concepts

● Decomposition

- The process of **breaking** down a system into smaller components
- Allows the systems analyst to:
 - Break a system into small, manageable subsystems
 - Focus on one area at a time
 - Concentrate on component pertinent to one group of users
 - Build different components at independent times

Important System Concepts

- **Modularity**

- Process of dividing a system into modules of a relatively uniform size
- Modules simplify system design

- **Coupling**

- Subsystems that are dependent upon each other are coupled

- **Cohesion**

- Extent to which a subsystem performs a single function

Information System Types

1. Transaction Processing Systems (TPS)
2. Management Information Systems (MIS)
3. Decision Support Systems (DSS)
4. Expert System and Artificial Intelligence (ES & AI)
5. Office Automation System (OAS)

Transaction Processing Systems (TPS)

- TPS are computerized information systems that were developed to process large amounts of data for **routine business transaction**.
- Automate the handling of data about **business activities and transactions**, which can be thought of a simple discrete events in the life of an organization.
 - Data about each transaction are captured,
 - Transactions are verified and accepted/rejected,
 - Validation transactions are stored for later aggregation.
 - Report may be produced to provide summarization of the transactions, and
 - Transaction may be moved from process to process in order to handle all aspects of the business activities.

Management Information Systems (MIS)

- Information system at the management level of an organization that serves the functions of planning, controlling, and decision making by providing routine **summary and exception reports**.
- It takes the relatively raw data available through a TPS and converts them into a meaningful aggregated form that managers need to conduct their responsibilities.
- Developing an MIS calls for a good understanding of what kind of information managers require and how managers use information in their jobs.

Decision Support systems (DSS)

- Information system at the management level of an organization that combines data and sophisticated analytical models or data analysis tools to support semi-structured and unstructured decision making.
- **DSS** are designed to help organizational decision making.
- A DSS is composed of a:
 - Database (may be extracted from a TPS/MIS)
 - Graphical/mathematical models for business process
 - User interface that provides a way to communicate with DSS

Expert System and Artificial Intelligence (ES & AI)

- **Expert Systems (ES)**- are computer programs that capture the knowledge of human experts and use it to solve complex problems.
- It is created on the basis of knowledge collected from human experts, and they imitate the reasoning process of a human being.
- Its concept originates from research in the field of AI.
- Artificial Intelligence (AI) is a field of computer science that studies the design and development of computer systems that mimic human intelligence.
- Knowledge Engineers perform knowledge acquisition; they are similar with system analyst but are trained to use different techniques.

Office Automation Systems (OAS)

- TPS, MIS, DSS, and EIS are designed for managers of various levels. Whereas OAS & ES are intended for workers of all levels, including those who are not managers.
- Its focus is automating office activities

Stakeholders: Players in the Systems Game

- **A stakeholder is any person who has an interest in an existing or new information system.**
- **Stakeholders can be technical or nontechnical workers.**

Stakeholders Classification

- **For information systems, the stakeholders can be classified as:**
 - **Systems analysts**
 - **System owners**
 - **End users**
 - **System designers**
 - **System builders**
 - **IT vendors and consultants**

Systems Analysts

- Systems analysts are the **key individuals** in the systems development process.
- A systems analyst studies the **problems** and **needs** of an organization to determine how people, data, processes, communications, and information technology can best accomplish improvements for the business.
- Most responsible for the analysis and design of information systems.

Skills of a Successful Systems Analyst

- **Analytical skills**

- Understanding of organizations.
- Problem solving skills
- System thinking
 - Ability to see organizations and information systems as systems

- **Technical skills**

- Understanding of potential and limitations of technology.

Skills of a successful systems analyst

- **Managerial skills**

- Ability to manage projects, resources, risk and change

- **Interpersonal skills**

- Effective written and oral communication skills
- Help you work with end user as well as other system analysts and programmers

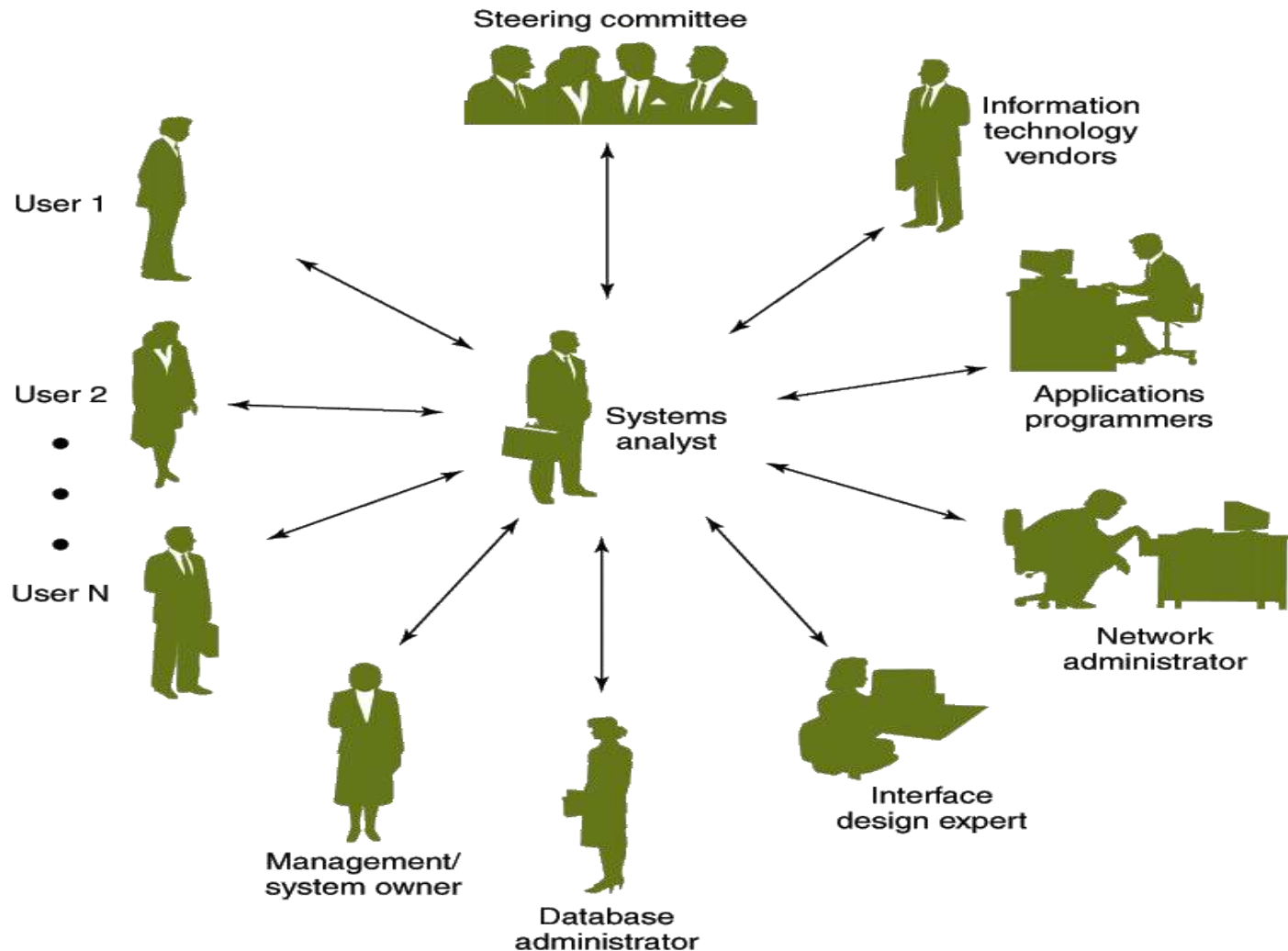
The analyst is responsible

- **for:**
 - The efficient capture of data from its business source,
 - The flow of that data to the computer,
 - The processing and storage of that data by the computer, and
 - The flow of useful and timely information back to the business and its people.

Variations on the Systems Analysts Title

- A **business analyst** is a systems analyst that specializes in business problem analysis and technology-independent requirements analysis.
- A **programmer/analyst** includes the responsibilities of both the computer programmer and the systems analyst.
- **Others**
 - Systems consultant
 - Systems engineer
 - Information engineer

The Systems Analyst as a Facilitator



Outcomes of SAD

- Application software (i.e IS) and
- Employee performance improvement